

### **REMARKS**

Applicants substantively respond to the Office Action dated December 7, 2009. In this response, Applicants have amended claims 1 and 10. Claims 8 and 9 have been canceled. New claims 16-23 have been added. Following entry of these amendments, claims 1-7, 10 and 12-23 are pending in the application.

Reconsideration of the present application is respectfully requested in view of the foregoing amendments and the remarks which follow.

#### **Information Disclosure Statement**

A Supplemental IDS is being concurrently filed, to address the comments made to the Information Disclosure Statement filed September 7, 2007 fails to comply with 37 CFR 1.98(a)(2).

#### **Objection of Drawings**

On page 2 of the Office Action, the USPTO has objected the drawings for not including the reference signs mentioned in the description: A, B, C and D. In response, Applicants state that the reference signs (A), (B), (C), and (D) are not elements or features depicted specifically within the drawings. Instead, reference signs (A), (B), (C), and (D) refer generally to parts of the invention as a whole: (A) refers to a DLC coated sliding member (of any type); (B) refers to the other sliding member; (C) refers to the disclosed oxygen-containing compound (C); and (D) refers to the disclosed aliphatic amine compound. Accordingly, Applicants respectfully submit that the drawings be formally accepted.

#### **Objections Under 37 C.F.R. § 1.75**

On page 3 of the Office Action, the USPTO has objected to claims 14 and 15 for failing to further limit the subject matter of a previous claim. In response, Applicants respectfully submit that claims 14 and 15 depend from claim 1 and contain all of the limitations thereof. However, claims 14 and 15 relates to a "low-friction agent composition" where claim 1 recites a "low-friction sliding mechanism." Accordingly,

different aspects of the same invention are being claimed in claims 14 and 15 compared to claim 1.

### **Rejections Under § 102**

The Office Action maintains the rejection of claims 1-10 and 12-15 as being anticipated by U.S. 6,969,198 to Konishi. In response, Applicants state that this rejection has already been overcome because Applicants have already submitted translations of the Japanese priority documents for the present application. Accordingly, this “prior art” reference should be removed based on the earlier date of the Japanese priority documents.

### **Rejections Under 35 U.S.C. § 103**

The Office Action also maintains the following rejections under 35 U.S.C. § 103 which Applicants summarize below:

- a. Claims 1, 2, 7, 8, 10, and 12-15 over U.S. 6,655,845 to Pope et al. in view of U.S. 5,064,547 to Rubin (“Rubin”).
- b. Claims 1, 2, 9, 10, and 12-15 over Pope et al. (“Pope”) in view of U.S. 5,108,633 to Buckley III.
- c. Claims 3-6 over Pope et al. in view of Rubin and further in view of U.S. 7,067,175 to Veerasamy.
- d. Claims 3-6 over Pope et al. in view of Buckley III and further in view of Veerasamy.

Description of the Claimed Invention. In response to these rejections, Applicants first state that this invention is directed to a low-friction sliding mechanism wherein a low-friction agent composition is interposed between sliding surfaces of a DLC coated sliding member (A) and a sliding member (B). An essential feature of the present invention resides in the combination of diamond-like carbon of the DLC coated sliding member and the low-friction agent composition containing at least one of an oxygen-containing compounds (C) like alcohols, carboxylic acids, esters, ethers, ketones, aldehydes, carbonates, derivatives thereof, and an aliphatic amine compound (D). As a result, the combination can provide excellent and unexpected low friction characteristics (excessively low friction coefficients), characteristics which cannot be realized under a

conventional lubrication theory. The excessively low friction coefficient obtained by the combination is, for example, at a high level of 0.029 or 0.037 as compared with a conventional low level of 0.132 or 0.148.

Description of the Cited References. Concerning the cited references: (a) Pope discloses a bearing having roller and race whose surface is coated with polycrystalline diamond; (b) Rubin discloses a lubricant composition containing saturated dicarboxylic acid having 6 to 32 carbon atoms (see claim 1); (c) Buckley III discloses a lubricating oil composition containing a long chain aliphatic hydrocarbyl amine which has a chain length of at least 50 carbon atoms (see claim 1); and, (d) Veerasamy teaches a DLC which is an a-C diamond-like carbon (ta-C) which does not contain hydrogen (see column 8, lines 35-36) for the purpose of repelling water and reducing corrosion (see column 1, lines 15-21), as pointed out by the Examiner in the Office Action..

Comparison of the Pending Claims to the Cited References. Applicants respectfully submit that the pending claims are distinguishable from the cited references for the following reasons:

1. Rubin discloses only saturated dicarboxylic acid. In this connection, "saturated dicarboxylic acid" is excluded from the claims of the present invention as they are presently being amended. Accordingly, this reference is no longer a pertinent citation as a secondary reference. For example, the combination of Pope et al. and Rubin cannot render the present invention obvious taken in combination.

2. None of the above cited references teaches the combination of diamond-like carbon and a low friction agent composition containing the claimed particular organic compound, and the significant advantages gained thereby (as discussed in the specification as originally filed). For example, neither Pope nor Rubin, either alone or in combination, teaches the combination of diamond-like carbon and a low friction agent composition containing the claimed particular organic compound and the significant advantages gained thereby. Similarly, neither Pope nor Buckley III, either alone or in combination, teaches the combination of diamond-like carbon and a low friction agent composition containing the claimed particular organic compound and the significant advantages gained thereby.

3. Also, there is no showing how a person skilled in the art would have been motivated to combine these cited references together, anyway, in the suggested combinations. There is also no showing that it would have been expected that the combined use of these three references would have provided the unexpected and surprising friction reducing effects discovered by Applicants.

4. The Buckley III reference is also distinguishable. Buckley III discloses long chain aliphatic hydrocarbyl amines having at least 50 carbon atoms. In contrast, the aliphatic amine compound of the present invention (as claimed) has carbon atoms ranging from 6 to 30. Therefore, the aliphatic amine compound disclosed in this Buckley III reference is outside the range of the present invention. Hence, this reference is no longer pertinent as a secondary reference. Accordingly, the combination of Pope and Buckley III cannot render the present invention obvious taken in combination.

5. Concerning the rejection of claims 3-6 over Pope in view of Rubin and further in view of Veerasamy, Veerasamy discloses a-C diamond-like carbon used "for purposes of repelling water and/or reducing corrosion on a coated article". In contrast, in the present invention, a-C diamond-like carbon (i.e., lowering a hydrogen content from 20 atomic % to 0.5 atomic % or less) is used for the purpose of further improving the effects (for friction reduction) according to the above-discussed combination of the features (a) and (b) of the present invention in combination with the oxygen-containing organic compound (C) and/or the aliphatic amine compound (D). Accordingly, this reference fails to teach the combination of a-C diamond-like carbon and the oxygen-containing organic compound (C) and/or the aliphatic amine compound (D). Applicants submit that this rejection based on these three cited references in combination do not render claims 3 to 6 obvious.

In at least these ways, the cited references, both alone and in combination, are distinguishable from the pending claims.

### **CONCLUSION**

In view of the foregoing amendments and remarks, Applicants respectfully submit that all of the pending claims are now in condition for allowance. An early notice to this

effect is earnestly solicited. If there are any questions regarding the application, the Examiner is invited to contact the undersigned at the number below.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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